or the combination with either of a delta-12 desaturase or a delta-15 desaturase gene." Applicant respectfully traverses.

The purpose of §112 "is to assure that the inventor provides sufficient information about the claimed invention that a person of skill in the field of the invention can make and use it without undue experimentation, relying on the patent specification and the knowledge in the art." *Scripps Clinic & Research Found v. Genetech, Inc.*, 927 F.2d 1565, 1571 (Fed. Cir. 1991). A patent need not teach and preferably omits, what is well known in the art. *In re Buchner*, 18 U.S.P.Q.2d 1331, 1332 (Fed. Cir. 1991). How a teaching is set forth, *i.e.*, whether by specific example or broad terminology, is not important. *In re Wright,* 27 U.S.P.Q.2d 1510, 1513 (Fed. Cir. 1993)(citing *In re Marzocchi*, 169 U.S.P.Q. 367, 370 (C.C.P.A. 1971)). Not every last detail of an invention must be described as a patent specification is not required to be a production specification. *In re Gay*, 135 U.S.P.Q. 311, 316 (C.C.P.A. 1962). Furthermore, a patent specification need not contain a working example of each and every embodiment of a claimed invention. *In re Strahilevitz*, 668 F.2d 1229, 1232 (C.C.P.A. 1982). Applicants submit that the specification meets the requirements of §112, first paragraph because the combination of the specific examples, the more general instructions given in the specification, and the knowledge common to one of ordinary skill in the art would fully enable a person of ordinary skill in the art to utilize the invention as claimed.

Applicant submits that the specification is fully enabling. Multiple examples within the specification create expression constructs that contain a delta-6, delta-12, or delta-15 desaturase, or combinations thereof.

Example 5, p. 42, teaches the creation of expression construct pCGN5535 which contains a nucleic acid sequence encoding a delta-6 fatty acid desaturase of *Mortierella alpina* ("Ma524 coding sequence"). This is taught, for example, at p. 42, line 19 through p. 43, line 7. For seed specific expression of the delta-6 desaturase, the expression construct pCGN5538 was created via the procedures taught at p. 44, lines 21-27. Expression construct pCGN5538 was introduced into *Brassica napus* cv.LP004 via *Agrobacterium* mediated transformation. Maturing T2 seeds were collected from six independent transformation events. Fatty acid composition of single

seeds was examined by gas chromatography ("GC") and compared to the fatty acid composition of a control. The results of this are provided in Table 5, pp. 45-49. The results listed in Table 5 indicate an increase in stearidonic acid levels in the T2 seeds of transformed plants.

Example 5 also demonstrates the creation of expression constructs containing a delta-12 desaturase. Specifically, Example 5, p. 43, line 23 through p. 44, line 7, demonstrates the creation of expression construct pCGN5540, which contains a nucleic acid sequence encoding a delta-12 fatty acid desaturase of *M. alpina* ("Ma648 coding sequence"). For seed specific expression of the delta-12 desaturase, the expression construct pCGN5542 was created via the procedures taught in the Specification on p. 44, lines 8-12.

Example 5 additionally teaches a method for expressing both the delta-6 and delta-12 desaturase sequences from the same T-DNA. Specifically, Example 5, p. 44, lines 13-20, teach the creation of expression construct pCGN5544 that carries the Ma524 delta-6 desaturase coding sequence and the Ma648 delta-12 desaturase coding sequence. Page 50, lines 1-10, teaches crosses between the *Brassica* lines containing the pCGN5544 construct and non-transformed canola varieties. F1 seeds were analyzed for stearidonic acid content and selected plants were grown and allowed to self pollinate to produce F2 seeds. Gas chromatography-fatty acid methyl ester ("GC-FAME") analysis from both single seed and half-seed samples from such crosses revealed significant levels of stearidonic acid, as demonstrated in Table 6.

Further enabling support is provided by Example 2. Specifically, Example 2, p. 23, line 15 through p. 25, line 18, teaches the creation of expression construct pCGN5558 that carries the delta-15 desaturase coding sequence of *Brassica napus*. Page 25, line 19 through p. 26, line 2, teaches a cross of plants transformed with the pCGN5558 construct with plants transformed with the pCGN5544 construct. Specifically, plants transformed with the pCGN5558 (and therefore overexpressing the delta-15 desaturase) were crossed with plants transformed with the pCGN5544 (expressing the *M. alpina* delta-6 and delta 12 desaturases). The resulting F1 seeds were analyzed for stearidonic acid levels. GC-FAME analysis of F1 half seeds revealed a significant accumulation of stearidonic acid in the seed oil of the *Brassica* lines. These results are provided in Table 1, pp. 27-29. Additionally, as indicated at p. 26, line 1, selected F1 plants

can be used for self-pollination to produce F2 seeds, as donors for production of dihaploids, or for additional crosses.

An alternative to crossing pCGN5558-transformed plants with pCG5544-transformed plants in order to obtain the plant expression of the *M. alpina* delta-6 and delta-12 desaturases and the *B. napus* delta-15 desaturase in the same *Brassica* plant is to combine the *M. alpina* delta-6 and delta-12 desaturases and the *B. napus* delta-15 desaturase on one T-DNA for transformation. This procedure is taught in Example 2, p. 30, lines 1-18, and results in the creation of expression construct pCGN5561. Seeds of pCGN5561-transformed plants contained significant amounts of stearidonic acid. These results are provided in Table 2, pp. 31-33.

The Specification, p. 14, line 27 through p. 20, line 14, teaches the techniques used for the creation of expression constructs, the choice of a proper host cell, the expression of the construct in a host cell, and transformation of a host cell. The methods taught on these pages of the Specification can be used to create and express the expression constructs within the desired host cells as taught in the Examples.

The above examples and related disclosure amply demonstrate the production of plants that have introduced into their genome the delta-6 desaturase and combinations of the delta-6, delta-12, and delta-15 desaturases. These examples clearly enable one of ordinary skill in the art to practice the current invention.

As an additional basis for its §112, first paragraph rejection of claims 1-12, the Office states that the Specification teaches "the unpredictability of producing altered levels of polyunsaturated fatty acids (PUFAs) in a plant." In support of this statement, the Office also cites the Specification, stating that the "production of PUFAs depends upon the host cell, the availability of substrate and the desired end product. Furthermore, it requires production of an enzyme that will function in the environment of the cell, having the appropriate pH optimum and the necessary cofactors, for example." The Office concludes, "the production of stearidonic acid in a plant cell by introducing exogenous desaturase genes is highly unpredictable." Therefore, the Office takes the position that it would require undue experimentation by one in the art to make and/or use the present invention, "given the uncertainty of producing PUFA in a cell; the

lack of working examples of plants producing stearidonic acid by the claimed method; the absence of guidance in the specification with regard to which desaturase genes will function [in] a given plant species to produce stearidonic acid; and the breadth of the claims which are drawn to the use of any delta-6 desaturase, including in combination with any delta-12 or delta-15 desaturase genes in any plant species." Applicant respectfully traverses.

Applicant asserts that while the cited factors may require consideration, their successful manipulation is well within the skill of the art, given Applicants provision of multiple working examples of plants producing stearidonic acid by the claimed method, and the invention is fully enabled. Furthermore, the Tables within the Specification indicate that the use of delta-6, delta-12, and delta-15 desaturases, or a combination thereof, as demonstrated in the Examples, produces an increase in the levels of stearidonic acid in plant cells. This demonstrates that the production of altered levels of the particular PUFA stearidonic acid is not unpredictable as asserted by the Office.

Moreover, the factors cited by the Office, and cited in the Specification at p. 9, lines 19-23, are merely routine considerations to be made when practicing the invention, and as such, do not rise to the level of undue experimentation. It is well settled that the test for undue experimentation is "not merely quantitative, since a considerable amount of experimentation is permissible, if it is merely routine, or if the specification in question provides a reasonable amount of guidance with respect to the direction in which the experimentation should proceed." *In re Wands*, 858 F.2d 731, 737 (Fed. Cir. 1988). Consideration of such factors is a merely routine use of the scientific skill possessed by those of ordinary skill in the art in selecting specific preferred embodiments.

The specification need not enable <u>all</u> possible combinations or embodiments of the invention, but merely enable representative embodiments of the invention. The factors cited by the Office, and cited at p. 9, lines 19-23, are matters related to the selection and formulation of specific preferred embodiments, and will vary depending upon the particular situations in which the invention is practiced. Those skilled in the art would readily recognize that such particulars are to be considered and that such considerations are merely a routine part of transgenic plant

production. This choice of particulars is a matter to be determined in the context of the particular conditions under which the invention is practiced. Such particulars are well known by practitioners of the invention – that is to say, persons skilled in the art to which the invention pertains, or with which the invention is most nearly connected. As demonstrated above, Applicant has enabled representative embodiments of the invention, and provided ample guidance for those skilled in the art to carry out the invention.

In addition, the Specification provides substantial guidance with respect to such factors. Specifically, the Specification, pp. 8–22 provides guidance with respect to the selection of desaturases based upon the host cell, the substrate, the desired end product, and the creation of expression constructs for use in the desired host cell. Particularly, the Specification p. 7, line 16 through p. 8, line 20, indicates representative desaturases that may be used to achieve an increase in the desired fatty acid, including stearidonic acid (p. 8, lines 5-8). Furthermore, the Specification at p. 8, line 22 through p. 10, line 21 teaches aspects of transgenic plant production of fatty acids. Moreover, the Specification at p.10, line 22 through p. 14 line 25, indicates sources of polypeptides having desaturase activity, including a representative list of microorganisms that may be used as a source for delta-6 and/or delta-12 desaturases. Finally, the Specification at p. 14, line 27 through p. 20, line 14 teaches the use and creation of expression constructs and selection of host cells. These particular portions of the Specification, in addition to others, provide substantial guidance to one skilled in the art on how to use the presently claimed invention.

In short, the Specification, through the combination of numerous examples, the more general instructions given in the specification, and the knowledge common to one of ordinary skill in the art, fully enables a person of ordinary skill in the art to utilize the invention as claimed, without undue experimentation. Furthermore, the Specification has enabled representative embodiments of the invention. Therefore, Applicant respectfully urges reconsideration and withdrawal of the rejection of claims 1-12 under 35 U.S.C. 112, first paragraph.

CONCLUSION

In view of the above, Applicant respectfully requests favorable reconsideration and allowance of the pending claims.

The Commissioner is hereby authorized to charge any deficiency or credit any overpayment in connection with this amendment to Deposit Account No. 19-1345

Respectfully submitted,

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